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A COMPUTER CONTROLLED DISPLAY SYSTEM WITH SCROLL BAR MEANS FOR INDICATING THE TYPE OF DATA BEING SCROLLED AT PARTICULAR LOCATIONS IN A DISPLAYED DOCUMENT

Technical Field

5   The present invention relates to computer controlled display systems, and particularly to user interfaces in such systems for scrolling displayed documents containing data of different information types so as to facilitate a user accessing information of different types from the

10   documents.

Background of Related Art

        For many years the data processing industries have been devoting great resources to making computer supported user interactive display technology systems and

15   methods to provide interactive users with an interface environment that is easy to use. This has been a major task since the great expansion of computer users over the past decade has expanded computer use to less and less skilled and sophisticated users. This effort has been

20   further driven by the rise of the Internet or World Wide Web (Web). The latter two terms are meant to be interchangeable are used as such throughout this application. In effect, there has been a technological revolution driven by the convergence of the data

25   processing industry with the consumer electronics industry. This advance has been even further accelerated by the extensive consumer and business involvement in the Internet over the past five years. As a result of these changes, it seems as if virtually all aspects of human

30   endeavor in the industrialized world requires human-computer interfaces. There is a need to make computer

directed activities accessible to a substantial portion
of the industrial world's population, which, up to a few
years ago was computer-illiterate or, at best, computer
indifferent. The population will, to a large part, have
5   to become involved with computer interfaces and computer
interfaces must, thus, continue to be simplified and made
more user friendly.

This problem of simplification is particularly
pronounced in the Web or Internet. Hypertext Markup
10   Language (HTML), which has been the documentation
language of the Internet or Web for years, offers direct
links between pages and other documentation on the Web
and a variety of related data sources that were, at
first, text and then images, and now include media, i.e.
15   "hypermedia", which involves audio, video and all types
of visual files. It was possible for the Web browser to
spend literally hours going through document after
document in search of hypermedia files of accompanying
media events in often less than productive excursions
20   through the Web. The obvious advantage of the
Web is that a user has extensive access to such media
events that he may access and use in his own
presentations. The problem remains in locating them. A
significant source of this problem is in the Web page,
25   the basic document page of the Web. In the case of Web
pages, we do not have the situation of a relatively small
group of professional designers working out the human
factors, rather, in the era of the Web, anyone and
everyone can design a Web page. As a result, pages are
30   frequently designed by developers without imaging or
graphics layout skills. Media files may frequently be
hard to recognize and locate in such pages. When we
refer to Web pages, we are actually referring to Web

documents that are often dozens of pages in length and
often eclectically developed and organized. Most do not
have adequate indices. Thus, the user has to scroll
through a lengthy Web document that frequently contains
5   ancillary distractions, such as advertising, to try to
find the particular data of interest.

Summary of the Present Invention

The present invention provides a solution that
simplifies scrolling through lengthy Web or other
10   documents in search of particular data types or files.
In a system for scrolling a displayed document using a
scroll bar for indicating the position of the displayed
data in the direction being scrolled, there is provided
means for determining the type of the displayed data
15   being scrolled at said position, in combination with
means responsive to said determining means for indicating
within said scroll bar the type of data being scrolled at
said position. A color indicator has been found to
provide very effective indication.
20   While this invention may be used quite effectively
on the Web for the above-described problems, it may also
be a tool in locating predetermined types of data in
scrolling through long word processed documents, such as
legal briefs or technical and commercial reports.
25   In the HTML documents of the Web or in E-Mail, the
invention is particularly useful in locating non-ascii
text files, such as GIF or MIME data files, within the
ascii text of the document. The scroll bar indicators of
the present invention may even be used to focus the
30   user's to embedded hyperlinks in such HTML documents.

Brief Description of the Drawings

The present invention will be better understood and its numerous objects and advantages will become more apparent to those skilled in the art by reference to the

5 following drawings, in conjunction with the accompanying specification, in which:

Fig. 1 is a block diagram of a data processing system including a central processing unit and network connections via a communications adapter that is capable

10 of implementing a user interactive workstation such as a Web receiving station on which received data may be converted into displayed Web pages;

Fig. 2 is a generalized diagrammatic view of a Web portion upon which the present invention may be

15 implemented;

Fig. 3 is a diagrammatic view of a Web page displayed and scrolled at a receiving display station with a typical GIF image data file being indicated by a scroll bar indicator;

20 Fig. 4 is a diagrammatic view of a received E-mail document displayed and scrolled at a receiving display station with a MIME image data file being indicated by a scroll bar indicator;

Fig. 5 is an illustrative flowchart describing the

25 setting up of the elements needed for the program for implementing scroll bar indicators to point to different data types in received Web documents; and

Fig. 6 is a flowchart of an illustrative run of the program set up in Fig. 5.

30 ## Detailed Description of the Preferred Embodiment

Referring to Fig. 1, a typical data processing terminal is shown that may function as a standalone

computer controlled display unit for processing displayed
documents or as a Web display station used for receiving
Web pages. Such display units or Web stations may be
used in the practice of the present invention for
5   scrolling documents and indicating the data types being
scrolled through indicators in the scroll bar.

A central processing unit (CPU) 10, such as one of
the PC microprocessors or workstations, e.g. RISC
System/6000™ (RS/6000) series available from
10   International Business Machines Corporation (IBM), is
provided and interconnected to various other components
by system bus 12. An operating system 41 runs on CPU 10,
provides control and is used to coordinate the function
of the various components of Fig. 1. Operating system 41
15   may be one of the commercially available operating
systems such as the AIX 6000™ operating system available
from IBM; Microsoft's Windows98™ or WindowsNT™, as well
as UNIX and IBM's AIX operating systems. Application
programs 40, controlled by the system, are moved into and
20   out of the main memory Random Access Memory (RAM) 14.
These programs include the programs of the present
invention for providing an indicator within the scroll
bar to indicate the type of data being scrolled. These
programs will be subsequently described in combination
25   with any conventional Web browser, such as the Netscape
Navigator 3.0™ or Microsoft's Internet Explorer™. A Read
Only Memory (ROM) 16 is connected to CPU 10 via bus 12
and includes the Basic Input/Output System (BIOS) that
controls the basic computer functions. RAM 14, I/O
30   adapter 18 and communications adapter 34 are also
interconnected to system bus 12. I/O adapter 18 may be a
Small Computer System Interface (SCSI) adapter that
communicates with the disk storage device 20.

Communications adapter 34 interconnects bus 12 with an
outside network enabling the data processing system to
communicate with other such systems over a Local Area
Network (LAN) or a Wide Area Network (WAN), which
5   includes, of course, the Web or Internet. I/O devices
are also connected to system bus 12 via user interface
adapter 22 and display adapter 36. Keyboard 24 and mouse
26 are all interconnected to bus 12 through user
interface adapter 22.

10   It is through such input devices that the user may
interactively relate to Web pages. Display adapter 36
includes a frame buffer 39, which is a storage device
that holds a representation of each pixel on the display
screen 38. Images may be stored in frame buffer 39 for
15   display on monitor 38 through various components, such as
a digital to analog converter (not shown) and the like.
By using the aforementioned I/O devices, a user is
capable of inputting information to the system through
the keyboard 24 or mouse 26 and receiving output
20   information from the system via display 38.

Before going further into the details of specific
embodiments, it will be helpful to understand, from a
more general perspective, the various elements and
methods which may be related to the present invention.
25   Since the major aspect of the present invention is
directed to Web pages transmitted over global networks,
such as the Web or Internet, an understanding of networks
and their operating principles would be helpful. We will
not go into great detail in describing the networks to
30   which the present invention is applicable. For details
on Web nodes, objects and links, reference is made to the
text, <u>Mastering the Internet</u>, G. H. Cady et al.,
published by Sybex Inc., Alameda, CA, 1996; or the text,

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Internet: The Complete Reference, Millennium Edition,
Margaret Young et al., Osborne/McGraw-Hill, Berkeley, CA,
1999. Any data communication system that interconnects
or links computer controlled systems with various sites
5   defines a communications network. Of course, the
Internet or Web is a global network of a heterogeneous
mix of computer technologies and operating systems.
Higher level objects are linked to the lower level
objects in the hierarchy through a variety of network
10   server computers.

        Web documents are conventionally implemented in HTML
language, which is described in detail in the text
entitled Just Java, van der Linden, 1997, SunSoft Press,
particularly at Chapter 7, pp. 249-268, dealing with the
15   handling of Web pages; and also in the above-referenced
Mastering the Internet, particularly pp. 637-642, on HTML
in the formation of Web pages.

        In addition, aspects of this invention will involve
Web browsers. A general and comprehensive description of
20   browsers may be found in the above-mentioned Mastering
the Internet text at pp. 291-313. More detailed browser
descriptions may be found in the above-mentioned
Internet: The Complete Reference, Millennium Edition
text: Chapter 19, pp. 419-454, on the Netscape
25   Navigator; Chapter 20, pp. 455-494, on the Microsoft
Internet Explorer; and Chapter 21, pp. 495-512, covering
Lynx, Opera and other browsers.

        A generalized diagram of a portion of the Web, which
the display 57 controlled by computer 56 used for Web
30   page receiving during searching or browsing, is connected
as shown in Fig. 2. Computer 56 display terminal 57 may
be implemented by the computer system set up in Fig. 1
and connection 58 (Fig. 2) is the network connection

shown in Fig. 1. For purposes of the present embodiment,
computer 56 display 57 serves as a Web display station
and has received displayed Web page 48 which is one of a
sequence of Web pages.

5   Reference may be made to the above-mentioned
Mastering the Internet, pp. 136-147, for typical
connections between local display stations to the Web via
network servers, any of which may be used to implement
the system on which this invention is used. The system

10   embodiment of Fig. 2 has a host dial-up connection. Such
host dial-up connections have been in use for over 30
years through network access servers 53 which are linked
51 to the Web 50. The servers 53 may be maintained by a
service provider to the client's display terminal 56, 57.

15   The host's server 53 is accessed by the receiving or
requesting terminal 56, 57 through a normal dial-up
telephone linkage 58 via modem 54, telephone line 55 and
modem 52. The HTML file representative of the Web page
48 has been downloaded to display terminal 57 through Web

20   access server 53 via the telephone line linkages from
server 53, which may have accessed them from the Internet
50 via linkage 51. The Web browser program 47 operates
within the display terminals 57 to control the
communication with the Web access server 53 to thereby

25   download and display the accessed Web pages 56 on display
terminal 57. The Web documents are accessed from Web
site resources 49 and 59.

       With this setup, the present invention, which will
be subsequently described in greater detail with respect

30   to Figs. 3 through 6, may be carried out using Web
browser program 47 in the case of scrolling through a Web
page. In Fig. 3, there is shown a Web page 64 that
originated from Web site 65 on the subject of Antarctic

Research 66. Assume that the Web document is made up of
a sequence of such Web pages. The page contains a video
69 of a moving ice tracking device which is provided by a
GIF file while the rest of the portion of the page 64
5 shown is HTML text (ascii) 60. When the Web browser
associated with the receiving station determines that the
page being scrolled reaches video 69, the browser then
determines if the non-ascii file 69 is a GIF file. The
browser may then look up a color for GIF files in an
10 appropriate table and may find, for example, red. Then,
during the scrolling of Web page 64 for the extent that
GIF image 69 is on the display screen, red indicator bar
67 will appear within scroll bar 61.

     Similarly, Fig. 4 is an illustration of an animated
15 MIME image 63 within an e-mail 60 that is received over
the Web. E-mail document 60 has been reduced in
extensiveness for purposes of illustration. Of course,
the E-mail may be a much more extensive document of many
pages with different attachments. A MIME attachment is
20 described in the above-mentioned text, <u>Internet: The
Complete Reference, Millennium Edition</u>, Margaret Young et
al., at page 810. It is described as a Multimedia
Internet Mail Extension that may be used in either Web
documents or E-mail. Dependent upon the user's needs,
25 the browser controlling the scrolling of Fig. 4 may be
set up to distinguish between ascii text 62 and non-ascii
data. Since the MIME is non-ascii, then when the non-
ascii portion is reached in the scrolling, i.e. image 63,
indicator 67 is turned on in scroll bar 61. Alternately,
30 the various non-ascii files within a MIME may be
recognized by their file extensions. Whether a non-ascii
file is part of a MIME, as in Fig. 4, or alone, as in
Fig. 3, the browser will read the file extension and

thereby determine the file type. On the Web, files
transmitted are identified by file extensions. For
example: dolphins.bmp, dolphins.mov, dolphins.jpg or
dolphins.gif, where the extensions define the file types.

5   The above-mentioned text, _Mastering the Internet_, at pp.
300-313, discusses the various file extensions handled by
Web browsers and the types and nature of the files they
designate.

While the present invention is most advantageously

10   used in identifying data types in Web documents and E-
mail, it may be used in standalone document processing
systems. For example, in a lengthy legal brief, changes
made throughout the document may be entered in italics.
Thus, the system of scrolling through the document for

15   subsequent proofing and editing may be set up so that
whenever the italics type of data is reached, the
indicator appears in the scroll bar.

Fig. 5 is a flowchart showing the development of a
process according to the present invention for providing

20   a scroll bar indicator identifying selected types of
data. The illustration will be at a Web receiving
station where there is provided a Web browser for
accessing pages from the Web and for loading and
displaying such pages at a receiving display station,

25   step 71. The browser is provided with the capability to
scroll the received pages via a scroll bar, step 72.
During the translation of the Web page from the received
Web page in HTML to the natural language of the displayed
document, the browser is provided with the capability of

30   defining non-ascii file types by identifying their
respective file extensions, step 73. A color ID Table is
provided for designating a different color for each file
type, step 74. The browser is provided with the

capability of looking up the respective colors for the
file types in the scrolled Web page and placing the
looked up colors in the scroll bar sections coincident
with the identified file type being currently displayed,

5   step 75. The browser then returns to other normal
browser functions when the scrolled data returns to the
ascii type, step 76.

The running of the process set up in Fig. 5 will now
be described with respect to the flowchart of Fig. 6.

10   The flowchart represents some steps in a routine that
will illustrate the operation of the invention as set
forth in the above process. An initial determination is
made, step 81, as to whether the user has requested a Web
page. If No, the process is returned to step 81 and the

15   selection of such a page is awaited. If Yes, then the
browser obtains and loads the requested Web page. A
determination is made as to whether the scrolling has
commenced, step 83. If No, the process is returned to
step 83 and the commencement of scrolling is awaited. If

20   Yes, then a further determination is made as to whether
the current data being scrolled past is ascii text, step
84. If Yes, it is routinely displayed, step 85. If No,
then the file type is determined, step 86, the color of
the determined file type is looked up, step 87, and the

25   appropriate color is displayed in the scroll bar
coincident with the file type being scrolled, step 88.
At this point and/or after step 85, a determination is
made as to whether we are at the end of the page being
scrolled, step 89. If Yes, the particular page is

30   exited, step 90. If No, the process is returned to step
83 where the scrolling is continued.

One of the preferred implementations of the present
invention is in application program 40, i.e. a browser

program made up of programming steps or instructions
resident in RAM 14, Fig. 1, of a Web receiving station
during various Web operations. Until required by the
computer system, the program instructions may be stored
5   in another readable medium, e.g. in disk drive 20 or in a
removable memory, such as an optical disk for use in a CD
ROM computer input or in a floppy disk for use in a
floppy disk drive computer input. Further, the program
instructions may be stored in the memory of another
10 computer prior to use in the system of the present
invention and transmitted over a LAN or a WAN, such as
the Web itself, when required by the user of the present
invention. One skilled in the art should appreciate that
the processes controlling the present invention are
15 capable of being distributed in the form of computer
readable media of a variety of forms.

   Although certain preferred embodiments have been
shown and described, it will be understood that many
changes and modifications may be made therein without
20 departing from the scope and intent of the appended
claims.